More Energy Problems

Apply the law of conservation to the following problems.

1. How much energy is required to throw a 1kg rock to the moon? Ignore the pull of the moon.
2. How much energy is required to move a 1000kg stationary satellite from:
3. the ground to one Earth radius altitude
4. one Earth radius altitude to two Earth radii altitude
5. two Earth radii altitude to three Earth radii altitude
6. In reference to the previous question: as we get farther from Earth, the energy required to travel a given distance gets \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. A 3000kg booster is disconnected from the space shuttle when it reaches an altitude of 72km. The booster falls from rest, its parachutes failing to deploy. Find the speed that the booster hits the water, ignoring air friction.
8. A satellite has to be put into orbit in two phases: first it has to be put at the correct orbital altitude, then it must be accelerated to the correct orbital velocity. Calculate the energy required to put a 2.125x106 kg satellite rocket into an orbit 180km above the Earth.
9. In reference to the above question, a small amount of energy can be saved by taking into account the velocity of the rotation of the earth. Assuming the rocket is launched from the equator find the percent of energy savings.
10. A 25000kg space probe has 1 MJ of fuel in its tanks. It is currently floating at roughly zero velocity at an altitude of 1000km above the Earth. How far can it travel on its fuel?
11. A satellite of mass 6000kg in orbit at 200km altitude is moved to an orbit of 300km. How much energy is required to make the move? [NOTE: the satellite is moving in each orbit]